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## WASHINGTON LETTER.

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WASHINGTON, June 15, 1893.

THE SMITHSONIAN INSTITUTION.—Professor Langley in his last annual report stated: "That the Smithsonian Institution is, by reason of its far-reaching connection with the scientific world, enabled to make specially effective use of sums given for immediate employment in specific purposes or investigations," and he felt assured that, were the intentions of the Regents better understood in this regard, the Institution would much more frequently be made the medium for giving effect to the plans of those interested in promoting specific researches, as well as in making permanent endowments.

The total permanent Smithsonian fund is now nearly \$1,000,000.

The Smithsonian Astro-physical observatory is still occupying temporary shelter. The money given to the Institution for the erection of a permanent building is held while awaiting the action of Congress in providing a site. In the report already referred to, the new branch of astronomy known as astro-physics is very concisely set forth. Its purpose is distinctly different from that of finding the places of the stars, or the moon, or the sun. Says Prof. Langley: "The distinct object of astro-physics is, in the case of the sun, for example, not to mark its exact place in the sky, but to find out how it affects the earth and the wants of man on it; how its heat is distributed, and how it in

fact affects not only the seasons and the farmers' crops, but the whole system of living things on the earth, for it has lately been proven that, in a physical sense, it, and almost it alone, literally first creates and then modifies them in almost every possible way. We have, however, arrived at a knowledge that it does so, without yet knowing, in most cases, how it does so, and we are sure of the great importance of this last acquisition, while still largely in ignorance how to obtain it."

The meteorological and physical tables originally prepared by Dr. Guyot, and first published in 1851, have passed through four editions, the last of which was exhausted several years ago. In preparing a fifth edition it was determined to conform the tables to the present state of our knowledge. This has been done with the aid of Prof. William Libbey, Jr., of Princeton, and Mr. G. E. Curtis of the Smithsonian Institution. The work will be hereafter known as the Smithsonian Tables.

Prof. Langley, on behalf of the Smithsonian Institution, has secured for a term of years a table at the famous zoölogical station at Naples for the use of American investigators in marine biology. And, as an advisory committee to aid him in the selection of candidates for the privilege of using the table, he has appointed Dr. J. S. Billings, U. S. A., Prof. E. D. Wilson, of Columbia College, Prof. J. A. Rider, of the University of Pennsylvania, and Dr. C. W. Childs, of the Department of Agriculture.

This Station is the greatest centre of biological research in Europe, and most important for advanced students and investigators. Although the tables as

they are termed, have been in existence for twenty years, this is the first time one has been secured by any American institution. The action of the Smithsonian in thus providing free access to advantages so eagerly sought from all quarters cannot therefore be too highly commended.

HYDROGRAPHIC OFFICE.--Lieutenant Commander Richardson Clover has been relieved of duty as Hydrographer, U. S. Navy Department, and granted several months' leave of absence, at the end of which time he expects to be placed on sea duty.

Commander Charles D. Sigsbee has been designated U. S. Hydrographer. A better selection could not have been made. Aside from the fact that he has twice already been connected with this office (in 1873-74, and again in 1878-82) he rendered while attached to the Coast Survey (1874-78), in charge of the S. S. *Blake*, most important service in developing, if not creating, new methods in deep-sea sounding and dredging. By means of the method he invented and put in operation on board the *Blake*, deep-sea work became nearly as ready of accomplishment as ordinary littoral soundings. A description of his instruments and their application was published in 1880. In consideration of the value of these improved methods and appliances he was awarded a decoration by the Emperor of Germany. Commander Sigsbee has been on sea duty fifteen years, and on land duty sixteen years—most of the latter at the U. S. Naval Academy.

THE FISH COMMISSION's hydrographic survey of the North Pacific region begun by the steamer *Albatross*

under Commander Tanner in 1888 has been completed between the Straits of Juan de Fuca and the Mexican boundary line. By this survey the contour of the continental border has been developed from the shore line into depths of 200 fathoms as far south as Point Concepcion, the region between the latter place and San Diego having been previously explored. A great wealth of hydrographic information of value to navigation has been obtained. A careful series of temperature and density, as well as biological observations in different parts of San Francisco Bay by Mr. C. H. Townsend, the naturalist of the *Albatross*, seems to indicate that the waters of that region are not, as has hitherto been supposed, unsuited to the breeding of Atlantic coast oysters. Dr. Bashford Dean, of Columbia College, N. Y., an expert on the subject of oyster-grounds, has been commissioned to study the methods of oyster-culture now practised in European countries, and to prepare an illustrated series of reports regarding these matters.

MARINE METEOROLOGY.—The effect of barometric pressure on ocean currents is a matter of discussion among meteorologists. Lieut. J. E. Pillsbury's observations in 1886 in the Gulf Stream clearly show the influence of barometric observations. The June *Pilot Chart* displays on two small charts a comprehensive and instructive presentation of the ocean current system of the North Atlantic, and the curves of average equal barometric pressure. While these present no new discoveries, they give new light, and will lead to observations for practical consideration of facts regarding the

barometer, which has not heretofore received the attention that it should, and it is hoped through these practical observations that beneficial results will accrue both to commerce and the science of meteorology. The Hydrographic Office invites careful observations on the extent to which the barometric pressure is a factor in influencing ocean currents. Comparing the blue wind arrows on the main Pilot Chart with the small barometer chart and the small current chart, a striking similarity appears between the curves, showing equal barometer pressure, directions of the winds, and general directions of the ocean currents. Among the causes which operate to produce and influence the winds and currents, this comparison suggests that the varying barometer pressure may be one of the original causes as well as a final influence on the direction of the currents, directly by its varying pressure, as well as indirectly through its relations to the wind. The subject is one of growing importance.

TOPOGRAPHIC SURVEYING.—The present stage of development in methods of topographic surveying is to be generously set forth in a manual, giving descriptions of the topographic work, instruments and methods used by the United States Geological Survey. The work will be accompanied by a collection of constants and tables used in the reduction of astronomical observations for position, of triangulation, of height measurements, and other operations connected with the making of topographic maps. While it is not intended as a general treatise on topographic work, it may to a certain extent supply the existing need of such a work.

Besides the valuable tables already referred to, it will contain an account of former and present surveys by the General Government, by States and by railroad companies.

The guarantee of the work is its author—Mr. Henry Gannett.

YELLOWSTONE PARK.—Mr. Gannett recently entertained the Geographic Society with personal reminiscences of the Yellowstone country at the time when the nearest settlements to the Park were one hundred miles away, and the nearest railroad was five hundred miles ; when the express train was a Concord coach, and the ordinary conveyance was on horse or mule back ; when the white and red man alike were wild, as well as all animal and vegetable life. He noticed the remarkable fact that when the first settlers, only a generation ago, came into Montana, and miners and prospectors flocked in rapidly and spread widely over the mountains in search of the yellow metal, they seem to have almost completely avoided the region now constituting the Yellowstone Park. And the same was the case with the early exploring expeditions. Lewis and Clarke passed to the north ; the Pacific Railroad explorers avoided it, passing to the north and south, while Reynolds, in 1860, travelled all around it, without apparently being able to penetrate it. The reason, he said, was not difficult to discover. The area of the Park is a high, undulating forest-clad plateau, traversed by mountain ranges and groups. It is the highest land north of Colorado, lying at the sources of the Missouri and Snake rivers, and has a very severe

climate. Snow lies on it until summer, and commences to fall again in August. Frosts occur every month in the year. It is always either winter, or late in the fall. On the east it is separated from the rest of the country by a high, almost impassable mountain range, stretching from the head of Wind River to the bend of the Yellowstone, which effectually prevents access from that side.

Mr. Gannett dwelt on the legends and stories about the region, and on the wanderings and experiences of various exploring parties prior to the Government exploration under Dr. Hayden in 1869, which resulted in establishing the Yellowstone National Park by an Act of Congress, in the spring of 1872. He related a curious circumstance as to the location of the southern boundary of the Park. It is described in the act as "the meridian through a point fifteen miles west of the most westerly portion of Madison Lake." At this time the name Madison Lake was applied to what is now known as Shoshone Lake, as it was then supposed that the lake was the head of Madison River. The name Madison Lake is now applied to a little pond at the head of Madison River, which for half the year at least, is dry. A literal interpretation of the statute would place this boundary several miles west of its true position for the six months of the year during which the lake is in existence, while during the other six months, when it is dry, there would be no western boundary at all.

Mr. Gannett was in charge of the party which, in 1878, made the Government map of the Park reservation.



TEXAS.—At a recent meeting of the National Geographic Society, Mr. Robert T. Hill, of the U. S. Geological Survey, presented so strikingly the physical characteristics of Texas that he may be said to have increased our knowledge of the geography of a country that includes within its area about one-twelfth of the entire United States. This area is so great and diversified that it embodies the distinctive features of every part of the country. In length and breadth the state is about equal—750 by 750 miles. Said Mr. Hill, it is a humid state, an arid state, a forest, a prairie, a mountain, and a plains state. It is a southern state a central state, and a western state—everything but a northern state.

The great Atlantic timber belt region extends into and ends in Texas, occupying in the northeast corner an area as large as Virginia. This portion is known as East Texas. In southern Louisiana and Alabama a narrow strip of prairie begins to appear between the timber belt and the sea. This is cut by bayous, whose banks are the home of the magnolia, the cape jessamine, and the palmetto. It has its greatest development along the Texan coast, and it is called the Coast Prairie Region, occupying an area as large as the coast states of New England. The great plains of the Dakotas, Nebraska and Kansas can be followed into Texas, finding there in their southern end a country equal in area to Kansas. If the approach to the region is from the city of Mexico, Santa Fé, Salt Lake City, or any point on the great central basin which lies between the crests of the Cordilleras, known as the Great Basin Region, the truly arid country is found to con-

tinue into Texas with all its characteristic aspects. The crests of the Rocky Mountains can be followed southward from Colorado and New Mexico into Texas, between the Pecos and the Rio Grande. It may be said, therefore, that from a natural standpoint Texas embraces physical features belonging to the Great Atlantic Coastal Plain, to the Coast Prairies of Louisiana, to the Great Plains of the West, to the Rocky Mountain Region, and to the Plateau of Mexico or Great Basin Region.

But while the natural features of Texas are largely the continuation of some of the grander divisions of the United States, the region is also, to a certain extent, physically insulated from them all. Upon the east and northeast are the waters of the Gulf of Mexico, and the malarial swampy regions of the Red and Sabine Rivers. Upon the north is the Indian Territory, with the Ouachita range of mountains extending from east to west. Upon the west are the arid deserts of Eastern New Mexico, perhaps the least populated of any portion of the United States, while the Rio Grande on the south has until recently proven a political barrier as great as though it were an ocean. These physical peculiarities are natural barriers to familiar interstate intercourse.

In the heart of the state and extending across it are the Black and Grand Prairies, a vast body of country which has no counterpart on this continent, and which possesses the most fertile of American soils. The easternmost part (the Black Prairie) constitutes perhaps the largest body of arable land in America, every inch of its 40,000 square miles being capable of culti-

vation. The western part (the Grand Prairie) contains some of the most picturesque landscapes in the country. There is an escarpment making a sudden ascent from the Black to the Grand Prairie region, the altitude changing from 600 to 2000 feet within a few miles. West of the Grand Prairie region lies what is known as the Wichita country, with a wheat growing population producing sufficient cereals for the consumption of the entire population of the state and a surplus for exportation.

Another peculiar region in Texas is the southeastern corner, which, in the light of recent events, might be termed Garza-land. It is a triangular area of low, dry country along the Rio Grande, covered with a dense, prickly, scrubby vegetation, everything that has thorns—mesquite, cactus, and cats-claw—some of which grow to a height not tall enough for timber, and yet sufficiently high to conceal a man on horseback. This country, so well adapted for nomadism and concealment, has been the refuge for all disturbed spirits of both nationalities. It may be termed the birthplace of Mexican revolutions, and the home of border bandits, Mexican and American.

But this same region is the source of the enormous range cattle industry of this country. Some of the great ranches occupy areas of 900 square miles, and for years have supplied stock for all the northward country.

In the northwestern portion of the state is the country known as the Llano Estacado—The Plains. Practically, the region may be described as a vast oblong *mesa*, lying between the Pecos and the Canadian

Rivers, including an area equal to the size of Iowa. The level of the plain at the northwest corner rises to a height of over 1000 feet above the Canadian River. It is a vast area, unmarked by trees or shrubs. Its chief vegetation is the short mesquite or buffalo grass, which grows in great luxuriance, making the lands especially desirable for grazing purposes. Its peculiar feature is the utter absence of streams, but an abundant supply of water can be obtained throughout the plains at depths averaging some 200 feet. Twenty years ago this plain, except the narrow neck between Fort Concho and Fort Davis, was considered a *terra incognita*, which, for want of water, not even the hardiest traveller dared penetrate; but since the construction of the Texas Pacific, and the railroad between Denver and Fort Worth, a large population has poured in, and now one is scarcely out of sight of the tall windmills which are scattered over it from one end to the other. It is a remarkable fact that the negro race has not acquired any foothold in this new part of Texas.

DEATH VALLEY EXPLORATION.—As a further contribution to the literature of the Death Valley expedition of 1891, Dr. C. Hart Merriam has prepared Part 2 of the report on results. It is a biological survey of Southern California, Southern Nevada, and parts of Arizona and Utah. It consists of special reports on birds, reptiles, batrachians, fishes, molluscs, insects, and the desert shrubs, cactuses and yuccas; and is accompanied by a list of localities. The writers of these reports in the order named are Dr. A. K. Fisher,

Stejneger, C. K. Gilbert, Riley, R. E. C. Stearns, Dr. Merriam, and T. S. Palmer. The consensus of opinions of these naturalists is that by means of the collections the science of biology has been materially advanced. Mr. Stejneger says that since the days of the great western expeditions, the Mexican boundary survey, the various Pacific railroad surveys, and Wheeler's survey west of the 100th meridian, no collection of North American reptiles and batrachians has been made equalling or even approaching that brought home by the Death Valley Expedition.

A map of the region traversed by the expedition exhibits an activity that must have tested the endurance of its members severely.

Part I, comprising the itinerary, description of the region, discussion of life zones, and report on mammals, is not yet ready.

HAWAIIAN ISLANDS.—A well condensed summary of the latest reliable data concerning the Hawaiian Islands has been prepared in the Military Information Division of the Adjutant General's office "for the information of the army."

While the work adds little that is new to our knowledge of the region, the compilation of existing facts has been so skilfully made (by Captain George P. Scriven, Signal Corps, and Lieutenant J. Y. Mason Blunt, Fifth Cavalry) that we have in forty-three quarto pages an admirable and well digested description of the physical features, climate, diseases, etc., of the eight islands constituting the Hawaiian group. The individual characteristics of Oahu, Hawaii, Maui,

Kauai, Molokai, Lanai, Niihau, etc., are described ; each as to its coast, interior, cities, towns, public buildings, manufactures, and publications, with general physical characteristics, soils, climates, earthquakes, etc. As might be expected, civil, political, and financial characteristics are set forth without bias. Methods of inland and foreign communication—roads, railroads, steam vessels, telegraph, telephones, postal service, and distances are described and charted. The strategic value of the islands and their geographic position are graphically indicated. There are also a general chart of the group and separate maps of Oahu, Hawaii, Maui, and Kauai. These islands, with Molokai, contain the bulk of the population as well as the chief industries. The climate is described as warm, but salubrious. In the shade it is never hot and seldom chilly. Major Dutton says there are almost as many climates as there are square leagues, but that relatively to human comfort the climate is perfection—the temperature varying from 55° to 75° in winter, and from 70° to 85° in the summer. Cold and hot “waves” and frost are unknown. About one-half of the population is native and half caste ; the balance is largely Chinese and Japanese, interspersed with Americans, British, Germans, French, Portuguese, Norwegians, and Polynesians. Ninety-one per cent. of the trade is with the United States. All forms of religion are tolerated, but the Protestants and Roman Catholics are largely in the majority. Laws are modelled on those of the United States.

Congress was strenuously urged in 1891 to make provision for cable communication with these islands.

An appropriation for the purpose was lost in the conference (trading) Committee of the two Houses during the last hours of the session. But, simultaneously, provision was made for a series of "soundings to be made between San Francisco and Honolulu for the purpose of determining the practicability of laying a telegraph cable between these two points." The President directed the work to be done by the Navy Department. The steamer *Albatross* began to take deep-sea soundings in October, 1891, and by January, 1892, two lines had been run between Monterey Bay, California, and Honolulu. The *Albatross*, being required for special investigations in Bering Sea, was detached from the work in February, and the steamer *Thetis* was detailed to run a third line between Point. Concepcion, California, and Hilo Bay, Hawaii. The work was prosecuted with all the care and accuracy that the means for modern deep-sea research afford. The results, prepared in the Hydrographic office of the Bureau of Navigation, have recently been given out.

The maps and observations present a good knowledge of the route, and establish the fact that the laying of the cable on almost any line between California and the Hawaiian Islands is practicable. A lane about 200 miles wide was developed, and the results seem to indicate the most favorable route to be a rhumb line between Monterey Bay and Honolulu. This line will require the smallest length of wire, and will pass over an even bottom favorable for the protection and preservation of the cable, avoiding submarine mountains. "The plan of the survey consisted in developing the bottom of the ocean by observations of the depth, the

character of the bottom soil, the temperature at the surface and bottom of the ocean, and the vertical distribution of temperature throughout the whole depth." The length of miles sounded was 6,785 miles. The distance steamed was 10,769 miles. The number of soundings was 874, taken at alternate intervals of ten and two miles along the great circle.

The magnificent physical hydrography developed in this interesting scientific investigation is the remarkable feature of the survey.

Within a very short distance from Salinas Landing a sudden depression of nearly 2000 feet in the ocean's bed is gradually increased to about 9000 feet at not more than fifteen miles from the coast. From this point the shelving continues on a more gradual scale until a comparatively level bottom is found at a depth of about 18,000 feet; and this great depth is continued to within a short distance of the Hawaiian Islands. At a distance of 570 miles from Monterey a mountain rises two miles and a half, or to within about 3000 feet of the surface of the ocean. A condition very similar was found 200 miles east of Honolulu. In both cases the water deepens quickly from the slopes, and the cable route, somewhat diverged, passes at the foot of the mountains.

Large colored charts represent profile views of the Pacific along a great circle of the earth between Salinas Landing and Honolulu; between Concepcion Point and Hilo Bay; and along a rhumb line between Salinas Landing and Honolulu. Also, a chart seven feet long represents in shades of blue and contour lines the bottom of the Pacific between California and the Hawaiian Islands.



The work of the Government will probably end with the survey. Private enterprise must construct and lay the cable. The plan and the best route have been mapped out. Whether a line merely connecting California with Honolulu would have enough business to make it immediately profitable is very doubtful. If extended to Japan or Australia the conditions would be vastly improved. But in view of the immense strategic importance of these islands, and the possible opening of the Nicaragua route, it is not likely that the great consummation will be long delayed.

ARGENTINE REPUBLIC.—A résumé of the condition of affairs in the Argentine Republic to the end of 1892 presents many gratifying aspects, in spite of the disastrous effects of the financial storm of 1890.

A new government came into power in October last, and since that time there has been an implied assurance that at least the peace of the country is safe. The national territories are all now organized under territorial government, and are generally in prosperous condition. The movement of progress has reached the mysterious regions of Tierra del Fuego, and it is said that the town of Usuaia, on the southern coast of that desolate country, is surrounded by pleasant gardens, while the Indians "converse in the English language, and have put on the garb of civilization."

Railway construction has been advanced to a moderate extent. The railroad in which the whole world is interested—that projected across the Andes to connect the Atlantic and Pacific—has been finished as far as Rio Blanco, leaving a gap of about 20 miles to the

Chilian boundary. On the Chilian side rails now extend for 20 miles, but much work has been done beyond that point, and the materials for the whole line are on the ground. The tunnel drilling should be completed with the plant now ready in about three years. Work is progressing from twenty-two different headings at the same time, and it is expected that when the rails have reached the foot of the pass from both sides a large passenger and cattle traffic will be carried on. The journey from Buenos Aires to Valparaiso by sea takes about twelve days and costs about \$200. By the railway it will take two days, at a cost of less than \$60. The Royal Mail Steamship Company is booking passengers through to Valparaiso, transporting passengers and luggage during the summer months (November to March) across the Andes.

The very large reduction in 1891 in the import of lumber, hardware, railway materials and combustibles (about \$30,000,000) shows how seriously the progress of the country has been retarded by the misfortunes of the government. The trade with Great Britain fell back \$32,000,000, and the commerce with the United States to the figures of twenty years ago. The figures for 1892 show some improvement.

CHINESE IMMIGRATION.—In Brazil the farmers are unable to procure sufficient help to carry on their business, and the best mode of introducing Chinese and Japanese laborers is the question now being discussed by the planters and speculators. It appears that the management of immigration is intrusted to companies, and one of these companies, at least, having fears that the Chinese will refuse to immigrate to this Republic

(!), has sent an agent to China to investigate the situation, and at present all eyes are turned to China. It is said that nothing will be left undone to make large additions of Chinese to the present population.

The Chinese land telegraph line has been joined to the Russian system. Messages can now be sent to any part of the world from any telegraph station in China. The only province not reached by telegraph is Yunnan, which still remains opposed to all foreign innovations.

PRIMITIVE SHIPS.—Mr. George H. Boehmer, long connected with the Smithsonian Institution, has published a study of prehistoric naval architecture in the north of Europe. His investigations and discoveries are mainly on the line of vessels which have been disclosed in excavations on the coasts of European countries. These boats have been discovered in many places.

The tribes inhabiting the British Islands at the time of the Roman invasion had, as might be expected from their proximity to water on every side, employed a species of boats—dugouts, capable of holding thirty or forty men. The contact of the invasion wrought improvement in these rude types.

Their Scandinavian neighbors were further advanced in the art of ship building, and instead of the primitive dugout, constructed built-up ships propelled by oars, so arranged as to be used in either direction without unshipping. Their prows were very high. Mr. Boehmer thinks that a navy of such ships must have been the growth of centuries before the Christian era. He claims that the numerous similarities between the ships

of ancient Greece and Rome and the remains of pre-historic ship-building in the north of Europe suggest a common origin, and he describes the more important points of similarity and dissimilarity. This ground is denied by many investigators, but Mr. Boehmer argues that the naval structures of Scandinavia indicate that the maritime explorations of the Phœnicians had a tendency to influence the ancient inhabitants of the north in the construction of their vessels. That the art taught the Phœnicians by the Egyptians may be traced to the Greeks, whose naval structures show a remarkable resemblance to those a thousand years older, and are produced in the Roman ships. There are contemporaneous accounts of the naval structures of these two nations, and the subject has been largely investigated and written upon during the last three and a half centuries, as shown by Dr. Emil Luebeck's bibliography in his *Seewesen der Griechen und Römer*.

Mr. Boehmer describes at length the dugout and ribbed boats and the evolutions of naval architecture of the Germanic people, the Saxons and the Scandinavians, citing authorities and illustrations very copiously.

To the custom of ship burial which was practised by the Scandinavians we owe most of the valued restorations of ancient naval structures. In accordance with this custom, the bodies of the prominent dead were taken to the ship that had been their home during life, and this, surrounded by their wealth, became their last resting-place. Two methods of burial existed; that of cremating the ship, together with its sepulchred inhabitants, and one in which a mound was erected over the ship and the dead. It is to the latter method that we

are indebted for some well preserved ships which extend our knowledge of prehistoric ship-building. Several notable excavations of ships buried for centuries have been made within a very recent period. These and others less known are minutely described and illustrated in Mr. Boehmer's admirable work.

From some boats exhumed in the duchy of Schleswig, which were of the type in use from 30 B.C. to 224 A.D., the use of the word starboard as applied to the right side of a ship is traced. These boats were propelled by oars and steered by means of an oar tied to a cushion of wood, fastened to the right side of the vessel. It was then called the "stearboard," and the evolution to the present term is simple.

Mr. Boehmer's work evinces great learning and much industry. It must be regarded as an important addition to the literature of prehistoric times.

H.